IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE BOARD OF PATENT APPEALS AND INTERFERENCES

In re Application of: Robert Wooley Brunson

Serial No.: 09/844,526

Filed: April 27, 2001

For: Deep Cryogenic Tempering of Brake Components

Examiner: Sikyin IP

Group Art Unit: 1742

Mail Stop: Appeal Brief-Patents
Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

APPLICANT'S' BRIEF ON APPEAL

Pursuant to 37 C.F.R. § 1.192, Applicant submits its Brief on Appeal, as follows:

Real Party in Interest (37 C.F.R. § 1.192 (c)(l))

The real party in interest in this appeal is Cryocon, Inc., a Colorado corporation, having a place of business at 2773 Industrial Drive, Ogden, UT 84401, by virtue of an assignment recorded April 27, 2001, at Reel 011768, Frame 0003.

Related Appeals and Interferences (37 C.F.R. §1.192(c)(2))

There are no other appeals or interferences known to Applicant, or to Applicant's legal representatives or assignees, which will directly affect, or would be directly affected by, or have a bearing on, the Board's decision in this appeal.

Status of the Claims (37 C.F.R. §1.192(c)(3))

Claims 2 through 8 remain pending in the application. Claims 2 through 8 were finally rejected in the Office Action of September 11, 2002, and are the subject of this appeal.

Status of Amendments (37 C.F.R. §1.192(c)(4))

An amendment after final was filed after the final rejection of September 11, 2002. An Advisory Action mailed April 4, 2003 in response to the amendment after final, indicated that the amendment would be entered.

Summary of Invention (37 C.F.R. §1.192(c)(5))

The claimed invention relates to a process of cryogenically treating brake components to produce improved molecular structures and enhanced structural properties. The process comprises first cooling the brake components to temperatures of approximately –300º F, followed by a gradual increase to approximately 300º F, and then finally a gradual cooling to ambient temperatures. The temperature of the brake components is increased and decreased through several stages that include an initial descent stage to achieve a brake component temperature of approximately –300º F, a static stage to hold the –300º F for a period of time, an ascent stage to achieve a brake component temperature of approximately 300º F, and a final cool-down stage to cool the brake components to ambient temperatures. More than one, and preferably three (3), post temper cycles or steps are employed.

Issue (37 C.F.R. §1.192(c)(6))

Would the invention set forth in claims 2-8 have been obvious to a person of ordinary skill in the art in view of Workman et al., U.S. Patent No. 5,447,035?

Grouping of Claims (37 C.F.R. §1.192(c)(7))

Claims 2, 3, and 7 stand together, claim 4 stands alone, claims 5 and 6 stand together, and claim 8 stands alone.

Argument (37 C.F.R. §1.192(c)(8))

Workman et al., U.S. Patent No. 5,447,035, does not teach or suggest multiple post tempers as required by claims 2, 3, and 7

All of the claims require a first post temper cycle of:

> (d) raising the temperature of the brake component to approximately 300º F at an ascent rate;
>
> (e) maintaining the temperature of the brake component at 300º F for a post temper time;
>
> (f) lowering the temperature of the brake component to room temperature at a cool down rate;

followed by at least one additional post temper cycle of:

> (g) raising the temperature of the brake component to approximately 300º F at an ascent rate;
>
> (h) maintaining the temperature of the brake component at 300º F for a post temper time; and
>
> (i) lowering the temperature of the brake component to room temperature at a cool down rate.

Claims 3 and 4 further require a third post temper cycle.

Workman et al. does not disclose multiple post temper cycles. In Workman, et al., the brake pads are warmed to room temperature over a period of 24 hours, and then:

> The chamber may be heated to about +300° F. Heating is generally much more rapid and the chamber and pads generally reach the upper limit in about one hour.

U.S. Patent No. 5,447,035, col. 4 lines 4-7.

Applicant's claimed process requires at least two post temper cycles (claim 2) and preferably at least three post temper cycles (claim 3) due to the material of the brake component being metallic rather than organic or composite materials for brake pads as required by Workman et al. The multiple post tempers are used with metal brake components to provide adequate stress relief and to affect a complete transition

of the ETA Carbides. Studies have shown that very little (less than 10%) of the ETA Carbide growth occur during the first post temper. More than one post temper cycle facilitates ETA Carbide transition.

In the Advisory Action, the Examiner rejected Applicant's arguments regarding ETA Carbide growth, as unsupported by the specification as originally filed, citing *In re Slocombe*, 184 U.S.P.Q. 740, 743 (C.C.P.A. 1975). However, In re Slocombe held that "There is no requirement that superiority over prior art be disclosed in the application; it is enough if the basic property or utility in which the advantage resides is disclosed. In re Lorenz, 51 CCPA 1522, 333 F.2d 908, 142 USPQ 101 (1964)." 184 U.S.P.Q. at 743. Applicant refers to the transition of ETA Carbide occurring upon multiple post temper steps to demonstrate that Workman et al., which admittedly does not disclose multiple tempering steps as required by the claims, does not make a *prima facie* case of obviousness.

Applicant's specification discloses and claims multiple post tempering cycles and explains the purpose: "to produce improved molecular structures and enhanced structural properties" (Application, Paragraph [0001]). The specification explains that "The improved molecular structure includes, for example, a certain transformation from austenite to martensite for components having a steel material type." (Application, Paragraph [0012]). This disclosed and discussed transformation of austenite to martensite is facilitated by the formation of ETA Carbides, but this explanation is not required to be in the specification. It is sufficient that the specification discloses that multiple post tempering steps are preferred, and that the result of the process is improved molecular structure. It was improper to ignore applicant's arguments about the improvement resulting from more than one post tempering steps, merely because one possible mechanism for the disclosed improvement – the formation of ETA Carbide was not disclosed ipsissima verba. Multiple post temper cycles are disclosed in applicant's application, but not in the prior art. There is no teaching or suggestion that multiple post temper cycles would be advantageous, let alone that it would result in the disclosed advantages.

For at least this reason, claim 2 as well claims 2 through 8 which depend directly or indirectly from claim 2, are allowable and the rejection of the claims should be reversed.

Workman et al., U.S. Patent No. 5,447,035, does not teach or suggest having the brake component be at a temperature of 100° F before entering the cryogenic processing chamber as required by claim 4

Claim 4 requires that the brake component temperature be "approximately 100° F at step (a)", *i.e.*, when the component is placed within the cryogenic processing chamber. The process of Workman et al. does not disclose a specific temperature for the brake pads whatsoever. The process of Workman et al. simply states:

> The process of this invention involves placing the pads in a processing chamber and gradually lowering the temperature in the chamber to about -300°F.

U.S. Patent No. 5,447,035, col. 3 lines 17-20.

The Final Office Action states that "the claimed approximately 100° F reads on ambient temperature" when in fact Workman et al. does not even mention the pads being at ambient temperature before being placed into the processing chamber. Since Workman et al. does not disclose a specific temperature for the brake pads, the invention set forth in claim 4 cannot be obvious.

Workman et al., U.S. Patent No. 5,447,035, does not teach or suggest raising the temperature of the brake component to approximately -100° F before the post temper steps as required by claims 5 and 6

Claims 5 and 6 require that the brake component temperature be at "approximately -100° F within the cryogenic processing chamber after step (c) and before step (d)", *i.e.*, before beginning the post temper steps. Workman et al. discloses having the brake pads be at room temperature before the chamber is heated to 300° F and the Final Office Action erroneously states that the temperature ramp up rate disclosed by Workman et al. is slow enough to consider the brake component being tempered at -100° F. Workman et al. requires that the brake pads be at room temperature before entering the processing chamber. More specifically, Workman et al. states that:

> The temperature of the chamber is gradually warmed to room temperature, preferably over a period of 24 hours. This phase is also known as the ramp up phase and raises the temperature about 15.5°F per hour. When the brake pads have again attained room temperature, the chamber may be heated to about +300° F.

U.S. Patent No. 5,447,035, col. 3 lines 66-28, col. 4 lines 1-4.

Workman et al. does not disclose the brake pads being at a temperature anywhere near -100°F before post temper heating. Rather, the brake pads are at room temperature and room temperature is significantly warmer than -100° F. Because Workman et al. requires that the brake pads be at room temperature before heating, the claimed step of having the brake components be at approximately -100° F before the post tempering cycles cannot be obvious.

Workman et al., U.S. Patent No. 5,447,035, does not teach or suggest cooling the brake component by introducing gaseous nitrogen into the cryogenic processing chamber as required by claim 8

Claim 8 requires that cooling of the brake component is accomplished by introducing gaseous nitrogen into the cryogenic processing chamber. Workman et al. does not contemplate gaseous nitrogen and instead states that:

> First, the brake pads are placed in a treatment chamber which is connected to a supply of **cryogenic fluid**, such as **liquid** nitrogen or a similar low temperature **fluid**.

U.S. Patent No. 5,447,035, col. 3 lines 30-33.

The use of a gaseous form of a cryogenic substance is different than a liquid form, and the brake components of the claimed invention are exposed to a gaseous nitrogen rather than a liquid nitrogen to prevent thermal shock. Further, the Final Office Action states that "using inert gas in heat treatment chamber to protect heat treating material from oxidize is contemplated within ambit of ordinary skill artisan." This does not provide any motivation to a person of ordinary skill in the art to use gaseous nitrogen in a cryogenic processing chamber. First, the claimed invention is not using the gaseous nitrogen in a heat treatment chamber as the office action erroneously states, but rather using gaseous nitrogen in a cryogenic processing chamber, which is entirely different than a heat treatment chamber. Even if it were obvious to use gaseous

nitrogen in a heat treatment chamber, there is nothing to teach or suggest its use in a cooling chamber, where oxidation would not be an issue. Therefore, there is no teaching to use gaseous nitrogen in a cooling chamber for applicant's claimed purpose or any other obvious purpose. The sole reference, Workman et al., does not disclose using gaseous nitrogen and thus the claimed invention cannot be obvious.

Conclusion

Workman et al discloses a process for treating organic or composite brake pads, not purely metallic brake components, and the process does not require multiple post tempering steps. Additionally, Workman et al. does not require that the brake pad be at a temperature of approximately 100° F before entering the cryogenic processing chamber or that the brake pad be at a temperature of approximately -100°F before the post tempering steps. Further, Workman et al. does not disclose a gaseous nitrogen and the gaseous nitrogen required by the claimed invention is used in a cryogenic processing chamber for cooling, not in a heat treatment chamber to prevent oxidation. For at least these reasons, Workman et al. cannot make the invention set forth in claims 2-8 obvious.

The rejection of claims 2-8 should be reversed.

Respectfully submitted,

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CERTIFICATE OF MAILING

I certify that on August 11, 2003, APPLICANT'S BRIEF ON APPEAL (in triplicate) was sent by first mail to: Mail Stop: Appeal Brief-Patents, Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.

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APPENDIX 1

(CLAIMS ON APPEAL)

2. A method for deep cryogenic tempering of brake components, the method comprising the steps of:

(a) placing a brake component at a temperature within a cryogenic processing chamber;

(b) cooling the brake component at a descent rate until the brake component temperature is approximately –300º F;

(c) maintaining the brake component temperature at –300º F for a stay time;

(d) raising the temperature of the brake component to approximately 300º F at an ascent rate;

(e) maintaining the temperature of the brake component at 300º F for a post temper time;

(f) lowering the temperature of the brake component to room temperature at a cool down rate;

(g) raising the temperature of the brake component to approximately 300º F at an ascent rate;

(h) maintaining the temperature of the brake component at 300º F for a post temper time; and

(i) lowering the temperature of the brake component to room temperature at a cool down rate.

3. The method of Claim 2, wherein steps (g), (h), and (i) are repeated for a third post temper time.

4. The method of Claim 3, wherein:

the brake component temperature is approximately 100 degrees F at step (a).

5. The method of Claim 2 further comprising the step of:

raising the temperature of the brake component to approximately –100º F within the cryogenic processing chamber after step (c) and before step (d).

6. The method of Claim 5 further comprising the step of:

transporting the brake component to a tempering oven after the temperature of the brake component is approximately –100º F.

7. The method of Claim 2 further comprising the step of transporting the brake component to a tempering oven during step (e).

8. The method of Claim 2, wherein the cooling of the brake component is accomplished by introducing gaseous nitrogen into the cryogenic processing chamber.